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SHORT NOTES ON THE LIFE HISTORIES OF VARIOUS SPECIES OF BIRDS

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A few notes on the Migrant Shrike, intended to appear with this paper, were in some way separated and published in the Wilson Bulletin, Vol. 33, page 67.

During a number of years of studying the life history of birds, particularly that part correlated with the breeding season, a quantity of short notes and uncompleted studies of nest life have accumulated. It is proposed to publish them under the above title. Our knowledge of the intimate life history of even the commonest species of birds is far from complete and it is hoped that these fragmentary notes may encourage others to make complete studies of these and other species of birds.

KILLDEER (*Oryzochus vociferus vociferus*)

Although the Killdeer is perhaps the most common shore-bird in the United States little has been published concerning its behavior. I have a few notes on courtship and nesting that were made in northwestern Iowa.

The behavior during courtship was witnessed on several occasions. On April 6, 1910, I came upon a pair going through this performance. The male had taken his station some distance from the female and at intervals whirled rapidly about uttering a curious stuttering note as he did so. Every few seconds the female advanced a few steps toward the male but when he stopped to observe the effect of his display she quickly turned her back and appeared perfectly indifferent. This was repeated several times until the female suddenly flew away.

In this region the favorite nesting place was at the base of a hill of corn. As a usual thing little or no attempt was made to build a nest—a few pebbles and bits of corn husks being the usual type. This material is seldom concentrated into a nest but is scattered over an area of one or more square feet, the eggs being deposited on the ground at some point within this area. In many instances the parents show little concern for the nest,

contenting themselves with giving the alarm note once or twice as they fly away.

On June 14, 1910, a rather unusual nest was found. It was placed in a small depression and carefully lined with shredded corn husks. It was situated near a hill of corn and contained at the time of discovery, 3:00 o'clock p. m., three eggs. On passing the nest at 7:00 p. m. of the same day I was rather surprised to see that the fourth egg had been laid in the intervening time. Twenty-five days later (July 9) at 8:00 a. m. one egg had hatched and by 1:30 p. m. all the young were out and the shells gone from the nest.



Movable blind used in studying birds' nests

It was impossible to approach the nest on foot without alarming one or the other of the birds, as one was always on guard some distance away. At the appearance of a person walking the one on guard would fly in a circle about the nest giving the alarm, at the first note of which the one on the nest ran rapidly until some distance away and then took wing to join its mate in circling about the intruder. A man plowing corn was viewed

with absolute indifference by both birds, the team often passing down the row next to the nest without disturbing the sitting bird. At an alarm, however, both birds flew about the field unless the intruder persisted in approaching the nest. In such a case one of the birds dropped to the ground near the person, invariably on the side away from the nest, and fluttered about apparently in the greatest distress. The attitude most frequently assumed was as follows: one wing was held extended over the back, the other beat wildly about in the dust, the tail feathers were spread and the bird lay flat on the ground constantly giving a wild alarm note. This performance continued until the observer came very near when the bird would rise and run along the ground in a normal manner or at most with one wing dragging slightly as long as pursuit was continued. If the observer turned back toward the nest, however, these actions were immediately repeated. When the parents had succeeded in luring the intruders about one hundred yards they seemed to be satisfied as they then flew away. However, the above actions could be witnessed indefinitely by returning to the nest after being led away.

The young were very active and exceedingly adept at hiding almost as soon as they were out of the shell. Their mottled coloring rendered them almost invisible when they squatted in the rough ground of the cornfield. They remained in the vicinity of the nest until July 16, after which the parents led them to the shores of a near-by pond.

THE FEEDING OF NESTLING MOURNING DOVES (*Zenaidura macroura carolinensis*)

During the spring and summer of 1915 the writer, while engaged in studying the habits and behavior of nestling birds, erected blinds at several nests of the Mourning Dove in an effort to learn something of the feeding activities. With one exception these attempts were largely failures. In central Iowa, where this work was undertaken, nearly every farm yard had its quota of these birds nesting in the groves and consequently no difficulty was experienced in finding nests to observe.

Although the first blind was erected on June 2, and such time as could be spared from other duties spent in watching this nest, no results were secured. A second nest was tried with similar results, but better fortune attended the third attempt.

At all three nests the general behavior was much the same. During the time they were under observation one or the other of the parents brooded almost constantly while the one off duty was generally to be found sitting within a few yards of the nest except when feeding. The parent usually left the nest as any one entered the blind and often remained away for a half hour or more. On returning the bird usually alighted some distance from the nest and slowly approached with mincing steps often taking five minutes or more to reach the nest.

At one nest one bird sat on the nest while the other occupied a branch directly over it. Both of these birds were very nervous and at the least movement or noise from within the blind both fluttered to the ground and went through the familiar performance used by many birds to draw intruders away from their nest or young.

At the third nest the birds were much less suspicious, and after spending some time for three different days the method of feeding was observed. On July 4 the nest was watched for five hours. The only action that occurred during that time was the relieving of the brooding bird after the first three hours.

On July 6, when the blind was entered at 5:30 a. m., the adult left the nest and did not return until 7:15 a. m., when it came into the nest tree and very deliberately began to walk toward the nest. Ten minutes were taken in covering a distance of as many feet. This bird had a peculiar habit of settling on the nest which may or may not be the usual thing among mourning doves. When within two or three feet of the nest the parent began to ruffle the feathers and roll the body from side to side, continuing this performance until the nest was reached. Two or three more rolling movements to settle comfortably on the nest followed, after which the bird became motionless save for an occasional slow turning of the head. Life at a mourning dove nest became exceedingly monotonous for the observer, but settling down for a long wait I determined to stay all day if necessary to see the feeding operation. Fortunately this was not necessary as at 7:30 a. m. a squab backed toward the blind and getting from beneath the parent raised its head and mutely begged for food. The adult (presumably the female) responded immediately by opening her beak and allowing the nestling to thrust its beak into one corner of her mouth. She then shut her beak on that of the nestling and after remaining motionless for a short time began a slow pumping motion of the head. The muscles of her throat could be seen to twitch violently at intervals, con-

timing about a minute, when the nestling withdrew its beak. The other nestling then inserted its beak and the process was repeated, 15 seconds elapsing before its beak was removed. With intervals varying from 5 to 10 seconds (watch in hand) four such feedings, two to each nestling, occurred. The nestling not being fed was continually trying to insert its beak in that of the parent and at the fifth feeding both succeeding in accomplishing this at the same time. The nestlings' beaks were inserted from opposite sides of the parent's mouth and remained in place during the feeding operation although I could not say whether or not both received food. While being fed the nestlings frequently jerked the head from side to side and also followed the motion of the parent's beak by raising and lowering themselves by the use of the legs. They were not more than five days old but had better use of their muscles than the young of passerine birds at from eight to ten days of age. The entire process described above occupied about six minutes, after which the nestlings crawled back beneath the parent.

Shortly after making these observations an interesting article on the rock dove which appeared in the *Auk* * attracted my attention. In this article the account of the feeding process is as follows: "The feeding of the young with the so-called 'pigeon milk' by both parents is an interesting phenomenon. The adult thrusts its bill deep down into the sides of the bill of the squab, vibrates its wings and works its neck muscles in a pumping manner. The squab, when not actually engaged in the feeding process, waves its wings and calls in beseeching, whistling notes for more."

Apparently here were two radically different methods of feeding practiced by two closely related species, but this discrepancy may be explained by the following quotation from Tegetmeier.† "To receive nourishment the young thrusts its beak into the side of the mouth of the old bird, in such a position that the soft food which is disgorged from the crop of the parent, with a sort of convulsive shudder, is received into the lower mandible or jaw which is widely expanded to receive it. It is singular that so simple an action as this should have been so greatly misrepresented as it has been by many writers. Even so

* Townsend, Chas. W., M.D. Notes on the Rock Dove (*Columba domestica*), *Auk*, Vol. XXXII, July, 1915.

† Tegetmeier, W. B. F. *Z. S. Pigeons; their structure, varieties, habits and management*. London, 1868.

good an observer as Yarrell described in his 'British Birds' the old pigeons as feeding the young by placing their beaks in the mouths of the little ones, and overlooked altogether the beautiful adaptation of the broad spoon shaped lower jaw to the habits of the animals."

It is evident that there are errors of observation present or that the doves have two different methods of feeding the squabs, possibly at different periods of the nest life. My own experiences with the Mourning Dove lead me to believe that Tegetmeier's account is correct. However, I call attention to it here with the hope that some one who has the opportunity will get at the facts of the case.

DOWNY WOODPECKER (*Dryobates pubescens medianus*)

Although I made many efforts to find a woodpecker's nest so situated as to permit close-range study, some condition necessary to success was always lacking.

The nearest approach to achievement was with a pair of downy woodpeckers. However, the factor here working against success was that the young left the nest before the study was fairly under way.

This nest was located about fourteen feet from the ground in an old gnarled boxelder tree. It contained at the time of discovery, June 2, 1915, four well-developed young. As soon as the nest was located a blind was erected and observations were started and carried on for an hour. On June 3 the study was continued but after two hours, when an attempt was made to move the blind closer, the young left the nest. During the three hours the nest was under observation the four young were fed 48 times, 21 by the female bird and 27 by the male. The young were very noisy and during the absence of the parent kept thrusting their heads out of the nest opening, screeching all the time. As one of the parents approached within sight the noise redoubled until one was fed.

Little was learned regarding the nature of the food. The distance of fifty feet was too great even with glasses to identify the food carried in the beak although it was practically always visible. Twice the male, foraging on a nearby tree trunk, was seen to catch spiders and on four different occasions a shiny brown larva was seen protruding from the beak of a parent bird as he scrambled along a branch of an oak within ten feet of the blind.

Both parents had stereotyped routes of approaching the nest and rarely deviated from them. This was to be expected as they had been feeding the young at the time these observations were made, practically the normal time for the nestlings to remain in the nest, and they therefore had opportunity to establish regular habits.

Attempts were made to study nests of red-headed woodpeckers and flickers but because of unfavorable location little result was secured. A flicker's nest situated near enough to the ground to make blind work feasible was found. The nest, however, was beside a street in the city limits and interruptions were so frequent that the work was given up. By watching an hour one morning from across the street we found that the female remained on the nest almost constantly. During the hour the male came, entered the nest with the female five times, remaining from three to five minutes at each visit. He was evidently feeding by regurgitation as no food was ever visible in the beak. After the young birds left the nest the pair were frequently noted feeding the young by a regurgitative process. This continued for at least two days.

The parent usually alighted upon the tree above the fledgling to be fed and the "pumping" was a comparatively easy process although always accompanied by considerable muscular effort. Once the male alighted below a youngster hanging nearly head down on a small tree trunk and the contortions resulting from the attempt were amusing to an onlooker though doubtless a very serious matter to the actors. Whether the youngster received any food or not I cannot say.

WOOD PEWEE (*Myiochanes virens virens*.)

During the spring and summer of 1915, while engaged in securing photographs of birds and nests for nature work in the schools, I was able to make a few notes on some of the birds while waiting for suitable poses and views.

Among the most interesting of these birds was a wood pewee, whose nest, discovered on June 30, contained three eggs. It was saddled on a long straight limb of an elm perhaps fifteen feet from the ground and about the same distance from the trunk of the tree. The only foliage on this branch was a spreading spray of leaves several feet beyond the nest. One would think that a nest so located would be easily discovered but such was not the case. While conspicuously located it was cunningly

woven onto the branch and so thoroughly covered with lichens that I could scarcely believe it was a nest even after seeing the bird alight upon it. From below it looked to be simply a lichen-covered knot or a small fungous growth upon the limb and only after we were on a level with it did it seem at all conspicuous.

On returning to this piece of woodland, July 13, this nest was found to contain two newly hatched young. At this time the limb was sawed off and lowered to within three feet of the



Wood Pewee brooding newly hatched young

ground and firmly fastened to strong stakes. When we returned several hours later we found one of the parents brooding contentedly on the nest. We were regarded with absolute indifference as we approached to within six feet to take a photograph. Altogether four hours were spent in the blind erected at this nest and seven feedings were recorded at this time. The weather was hot and the nestlings newly hatched, consequently, brooding and shade were of more importance at this stage of the nestling period than later when the growing birds need relatively great quantities of food. The minute insects brought could not be identified.

The blind was entered at 7:45 the next morning and immediate preparations for taking photos were made. The brooding bird

was not disturbed by my entrance into the blind but as the camera lens appeared in the opening of the blind she left the nest and dashed repeatedly at the lens, snapping her mandibles vigorously. This continued for several minutes before she finally returned to the nest. At intervals during the morning she renewed her attack on the lens but aside from this paid no attention to either the blind or my movements.

The female brooded regularly throughout the morning, usually staying from twenty to thirty minutes between trips for food. In the early morning hours while the nest was shaded the brooding bird sat closely on the nest. As the sun struck the nest during the heat of the day the parent stood in the nest with partially extended wings and open mouth.

Several times the brooding bird left the nest to dash out after a passing insect, sometimes succeeding and sometimes failing in capturing it. On every occasion of feeding the nestlings, the legs and antennae of small insects, largely dipterous, were visible in the beak of the parent bird.

Both birds were quiet about the nest and apparently absolutely unafraid of either the blind or a person. Several times in watching various species of birds I have noticed the same absolute lack of fear in individuals and it has always been correlated with the same period of the nest life, namely, the first twenty-four to forty-eight hours after hatching. It seems that at this time the brooding instinct reaches the stage of highest intensity during the nestling period and almost, if not quite, completely inhibits the instinct of fear. The following species of birds, which in my experience are usually among the most timid and retiring, have exhibited this same behavior: King Rail, Least Bittern and Pied-billed Grebe. The bittern and the rail allowed me to touch them and pecked at my fingers like an angry hen. Such birds as the chickadee, robin, bluebird, and others more familiar with human beings also have frequently allowed unusual liberties to be taken with them at this period.

BRONZED GRACKLE (*Quiscalus quiscula aeneus*)

Although one of the most common birds in Marshall County the Bronzed Grackle was by no means the least interesting. Every coniferous grove for miles around Marshalltown contained its breeding colony of grackles.

A nest in one of these colonies located close to town was chosen for the work of securing photos of the feeding activities

of the grackles. The nesting grove consisted of spruce, white pine, cedar, apple, and plum trees with a hedge of mulberries on the north. It contained approximately thirty nests, sixteen of which were occupied on May 30, the date on which the work was started.

Attention was first attracted particularly to this colony by the curious and unusual feeding habits of the birds. Instead of foraging closely about the orchard, barn yard, and near-by fields,



Bronzed Grackle male feeding young

as is the common habit of the species in this locality, a steady flight of birds was noted leaving the colony and an equal number were noted returning in another flyway loaded with food for the nestlings.

On investigating the reason for this, a very interesting state of affairs was discovered. The nesting grove under consideration was located on a slight knoll facing the northeast about three quarters of a mile from the Iowa River. At this time, however, the river was out of its banks with flood water and had spread out over the lowlands to within a quarter of a mile of the grove. At the point towards which the Grackle flight was directed was located a blue-grass pasture nearly level but con-

taining numerous little elevations of a few inches above the remainder of the land. The water was just deep enough to cover the grass on the lower parts but to leave the tops of the vegetation on these slight elevations still above water. This condition obtained over a strip of approximately a rod out into the pasture. This high water had caused a great migration of cutworms, earthworms, crickets, spiders, tumble bugs, ground beetles, and other insects into the short grass on these little knolls. From one of these little points containing slightly less than one square foot I secured thirteen earthworms.

It was in this territory that the Grackles were feeding. Not only Grackles but Robins, Meadowlarks, Cowbirds, and Green Herons were busily feeding on these refugees. It was rather surprising to me to see such birds working in the shallow water but the flood had provided a bountiful harvest and the birds were making the most of it. A strong wind was blowing from the northeast and both grackles and robins feeding from the grove flew close to the ground on the outbound trip while on the return they rose high in the air and came sailing in with the wind. The two movements were practically continuous and gave the birds the appearance of flying in a giant elipse.

To obtain some idea of the number of trips made by the parents, attempts were made to count the birds returning laden with food. During one hour, from ten to eleven in the morning, 53 Grackles entered the eastern half of the grove. From 12:15 to 1:15 p. m. two observers, each watching half the side of the grove facing the river, counted a total of 217 birds returning from this feeding ground carrying food to the young. This is an average of over three to a minute and as there were sixteen nests with young, or a total of 32 parents feeding, each parent must have made about six trips per hour.

All the nests in this colony were of similar construction. If in conifers, they were among the short branches near the tops, while in the plums they were built wherever a suitable fork was found. The nest consisted of a foundation of small sticks, a body of corn husks and morning glory stems and a lining of fine grass, root fibers, wool, and feathers.

A blind was placed in position at a nest seven feet from the ground in a plum tree on May 30 at 11:00 a. m. At 1:00 p. m. I entered the blind and found the parents somewhat nervous so only remained about two hours. Only the female summoned up

courage to feed during that time and she fed both nestlings each trip but the last. Eleven minutes after entering the blind the female appeared carrying two earthworms and two or more unrecognized insects. After hopping nervously about from limb to limb above the nest she hurriedly fed both nestlings and left. At the sixth feeding she carried seven cutworms in her beak and fed them one at a time to the two nestlings. On the last feeding she came three times and thrust her bill into the nestling's mouth apparently without feeding. On the fourth return she fed one nestling, and the fifth time returned and gave the remainder of the food to the same one.

On May 31 I watched this nest from ten o'clock until three, during which time the young were fed 26 times, the male feeding nine and the female seventeen times. On two occasions the parents arrived at the nest simultaneously to feed.

During the thirty-three feedings observed in the seven hours' watching, 12 earthworms, 9 crickets, 60 cutworms, 2 spiders, 2 kernels of corn, and 7 or more unknown insects were fed to the nestlings. It is understood, of course, that there may have been other material fed, but that these numbers were actually counted. The term "cutworm" is rather broad, but the word is here used to cover the dull greasy-looking caterpillars usually known to the farmer as cutworms. The grackle's habit of carrying worms crosswise of the beak made it comparatively easy to count them at this nest.

When we returned here on the morning of June 1 we found the nest destroyed and our blind torn down, evidently the work of boys, from footprints about the place.

During the second day at the nest both birds became very tame and unsuspicious and the male frequently indulged in a curious half song accompanied by an odd acrobatic performance. I have frequently seen this performance at a distance and can not suppose that it is anything new, but at a distance of two feet it impressed me as most ludicrous. The following excerpt from my notebook for that date is evidence of the impression it made at the time: "The song is brought out by jerking open the wings and tail and jerking the body upwards as if trying to fly when stuck fast. The resulting hump much resembled, I imagine, the one given by Mark Twain's famous frog in his historic buck shot laden performance."

YELLOW WARBLER (*Dendroica aestiva aestiva*)

During the spring of 1915, while attempting to secure photographs of birds for school work I had my blind at two yellow warbler nests without succeeding in getting any very good negatives. The color of the birds seemed to be the great drawback to securing good results, as in most negatives they appeared practically indistinguishable from the dark green background of the leaves. I did, however, succeed in securing a few notes on their behavior at the nest.

Nest No. 1 was discovered on June 13 and contained at this time four eggs. The nest was located in one of a row of gooseberry bushes and was approximately two feet from the ground. June 20 the eggs were hatching and on June 21 the blind was erected, observations starting at 9:00 a. m. on the morning of June 22. This nest was watched for two hours on June 22 and one hour on June 24. When I returned to the blind on June 28 the young had disappeared. During these three hours the male fed the young ten times, the female came fourteen times, and four times while I was busy with the camera I failed to note the sex of the parent or material fed. Both parents were nervous, active little folks and except for their fortunate habit of carrying things in the tip of the bill I would have been at a loss to learn anything of the material fed. When feeding the small green larva, so common at this season of the year, they carried many of them by one end, the other end dangling loose. Apparently nothing else was carried at these times as I could see through the parted mandibles behind the larva. On one visit the male came with seven of these larvæ hanging from his beak. He tried to ram them all down the throat of one nestling at one time but failed in this and had to give them in three instalments. Usually the larvae were picked from the bushes in the immediate vicinity of the nest and brought in one or two at a trip. Forty-six recognized objects were fed in 28 visits, including 30 green larva, 3 winged insects, 2 spiders, and 11 or more small, much crushed objects which I could not recognize at all.

Several times the male gave the worms he brought to the female who in turn fed them to a nestling. The male was much the more timid of the two in this pair of birds. He made seven attempts to approach the nest on his first visit on the morning of June 24, while the female sat on the nest brooding. On such an occasion the female awaited the approach of the male with the food with open mouth and quivering wings. Her behavior

very closely resembled that of a fledgling bird awaiting the arrival of a parent with food.

Nest No. 2 was discovered when hardly finished on June 13. On the 16th it contained two eggs and on the 18th four eggs. Incubation had commenced on the 18th as I saw the male feeding the female on the nest several times. These eggs hatched on June 29, making the incubation period about eleven days. Only two of the eggs hatched, the other two remaining in the nest for some time.

On June 30 the blind was erected and an attempt was made to use it the same day. The birds, however, proved so wild I gave it up and it was not until July 3 at 3:30 p. m. that anything could be accomplished. In direct contrast with the other pair of warblers, the female at this nest was wild and nervous, the male feeding twenty-four times and the female ten during the three hours the nest was under observation. The male had fed eleven times before the female became enough reconciled to the blind to feed the young. During this time the young were fed thirty-four times, during which 26 green larvae, 11 small winged insects, 1 spider, and 7 unrecognized objects were fed to the young. As remarked in discussing the first yellow warbler nest the habit of carrying food in the tip of the bill was marked and made it comparatively easy to identify larvae. At both these nests there was a great abundance of small dipterous insects and small larvae within a few inches or feet. This may have had some influence on the quantity of food carried on each trip by the parent as I have noted other warblers with beaks fully loaded coming to the nest. At these nests there were few times when more than one insect was carried.

The excreta at both nests was disposed of either by swallowing or carrying away and the nests were kept scrupulously clean.

REDSTART (*Setophaga ruticilla*)

On June 26, 1915, while camping on Mormons Ridge north of Marshalltown, Iowa, I discovered a redstart nest containing one egg. This was a dainty nest woven of grass, hair, and root-lets in a fork of a hazel bush about four feet from the ground. On each of the two succeeding days, June 27 and 28, an egg was laid and on the afternoon of the latter date incubation commenced. I watched the nest for three hours on the afternoon of the 28th. During this period the male came once to feed the

female and sang at the nest for some time before taking his departure.

On July 13 I returned to Mormons Ridge and found three young about three or four days old. I immediately erected a blind at the nest and returning at four in the afternoon found the parents still making more or less fuss over the blind. I returned at 7:50 a. m. on the morning of the 14th and staid until 11:40 a. m. During this time I succeeded in exposing many films but failed to secure good negatives.

During the five and one-half hours that I watched the nest the nestlings had 30 feedings, 10 of which were made by the female and 20 by the male. I found it impossible under the conditions at this nest to identify much of the food except in a very general way. The bushes simply swarmed with minute insects, mostly dipterous, and small green larva, a large portion of which were geometrids. Twenty-two winged insects, sixteen larvae, one fly, and one spider were recognized during the thirty feedings, and on three occasions when the young were fed I could make out nothing as to its character.

Of the two parents the female was much the more shy and timid. The day was hot and the nest partially exposed to the sunshine. The male seemed to realize the necessity for brooding the young. Several times he chased the female through the bushes scolding angrily until she settled on the nest. I can not say whether he was really trying to force her to brood the young but his actions had every appearance of such an effort. The female was manifestly much worried by the blind while she was brooding. At first she twisted and turned continuously, but toward the end of the observation she became more quiet.

The male at this nest displayed a greater freedom from "nerves" than any male bird I ever watched. When feeding he came boldly to the nest after the first two trials. The click of the camera, which was sufficient to send the female from the nest in headlong panic, merely caused him to lift his head and stare into my face through the peep-hole in the blind, which was eighteen to twenty-four inches away. It was very evident that he saw nothing to fear in the muslin blind or the clicks that emanated from it and that he could not understand the absurd behavior of his wife. She gradually became reconciled to the situation when she saw no harm coming to her mate.

The actions of the two birds, however, were very interesting and I only wished it were possible to remain longer.

ROBIN (*Planesticus migratorius migratorius*)

During the course of several years' study of nestling birds and behavior of parents at the nest I had occasion to work at two robins' nests. The first one was a full day study at Sioux City, Iowa, and the second a period of ten hours spent over several days securing photographs. During this time notes were made on the behavior of the birds.

Nest No. 1 was located in an apple tree about eight feet from the ground. It was in all respects a typical robin's nest both in structure and location. It was necessary to build a platform for the blind in order to see into the nest. The special purpose of the study was to determine if possible the amount of fruit fed to the young under favorable conditions. Within twenty yards of the nest tree lay a 2-acre field of strawberries and the edge of a 20-acre cherry orchard a hundred and fifty yards away, both containing an abundance of ripe fruit. The two nestlings were well grown, in fact almost ready to leave the nest. The nest was under observation from 4:20 a. m. until 8:00 p. m. on June 30, 1913.

During this time the female brought food to the nest 43 times and fed a total of 71 objects to the young. On ten occasions she fed both young from the supply she carried. Nestling No. 1 was fed 27 times and No. 2, 26 times. The food was somewhat roughly classified as follows: 15 crickets, 1 grasshopper, 5 maybeetles, 6 other beetles, 1 bug, 10 cutworms, 4 other larvae, 22 earthworms, and 7 or more insects so badly mutilated as to be unrecognizable. As many as four earthworms were counted dangling from the beak on one trip. It is not desired that this be considered the maximum number but rather the minimum. In other words, out of a mass of worms carried four were actually distinguished out of possibly a greater number.

The female did all the feeding, the male spending his time in the tops of nearby trees, singing. The young were well feathered out and the nest well shaded, which may account for the fact that there was no brooding while the nest was under observation.

Early in the afternoon a farmer started plowing a piece of ground about 150 yards away and the female at once commenced to visit this land to pick up the earthworms exposed by the plow. She continued to feed earthworms as long as the plowing was carried on.

The amazing thing to me in this day's observations was the

fact that no fruit was brought to the nestlings, although strawberries and cherries, both fruits for which the robins have a fondness, were convenient. I often saw adult robins feeding on the two fruits but this bird never brought any fruit to the nestlings.

Nest No. 2 was discovered June 5, 1915. It contained four eggs which hatched on June 10. The blind was erected on the fifth some distance away and moved nearer a few feet at a time, so that by the time the eggs had hatched the parents were quite reconciled to its presence. To facilitate moving, it was put upon an open top buggy and moved about not only to this nest but to several others in the vicinity.

This nest was under observation 11 hours and 45 minutes during five different dates as follows: June 11, 3 hours and 20 minutes; June 12, 2 hours and 20 minutes; June 16, 1 hour and 50 minutes; June 17, 2 hours and 15 minutes; June 18, 1 hour; June 21, 1 hour.

This nest was in an apple tree in the midst of an orchard. Mulberry trees and raspberry bushes were near by, but at no time while I watched did the parents feed any fruit to the nestlings. The female was frequently seen feeding on the mulberries and a flock of goldfinches were noted once feeding on the ripening fruit.

During this time the nestlings were fed 34 times by the male and 19 times by the female, a total of 53. This difference was not due to any timidity on the part of the female but to the necessity of brooding the young. During the 53 feedings 8 cutworms, 46 larvae of various kinds, some of which may have been cutworms, 38 earthworms, 1 maybeetle, 2 other beetles, 1 grasshopper, 3 crickets, and 13 unrecognized forms were detected out of a probably greater number. On 28 visits only one nestling was fed, on 19 two were fed, and on 7 the entire brood of three shared in the load of food carried.

The robins secured most of the food in a cornfield a few yards away—picking up the earthworms and cutworms exposed by cultivation on three out of the five days. At other times they foraged in the garden and about the orchard.

The excreta was carried away eight times and devoured a like number.

On June 11th the female brooded 1 hour and 55 minutes out of a total time of 3 hours and 20 minutes the nest was under observation. On the 12th 46 minutes were spent in brooding out

of 2 hours and 20 minutes; on the 16th 1 hour and 23 minutes out of 1 hour and 50 minutes; on the 17th, 56 minutes out of 2 hours and 15 minutes; and on the 18th, 13 minutes out of 1 hour.

On the 21st the young left the nest. The parents at this nest were exceedingly business-like in the care of their young. They paid little or no attention to the blind and carried on their activities in a regular stereotyped style. Both had a regular method of approach to the nest.

BREEDING OF THE GOSHAWK (*Accipiter atricapillus*)

AT PETERSHAM, WORCESTER COUNTY, MASSACHUSETTS,
AND OTHER BIRD NOTES FROM PETERSHAM

BY J. A. FARLEY

I take pleasure in reporting the breeding of the Goshawk (*A. atricapillus*) last spring in Petersham, Massachusetts. This is the first record of the breeding of the Goshawk (*A. atricapillus*) in the state. Such an event has long been looked for as individuals of the species have been seen in summer more than once in the past in Massachusetts. The last summer record of the species was by Mr. Gerald H. Thayer who saw an immature Goshawk, August 15, 1900, in Berkshire County this state. (Auk, XIX, 1902, p. 296)

The two young birds in the Petersham Goshawk's nest were taken alive, in the down, May 22, 1902, by Mr. J. Nelson Spaeth of the Harvard Forest at Petersham. The nest had been reported to Mr. Spaeth who visited it first on May 20 when the two, downy, peeping young could be seen from the ground. The nest was high up in a tall white pine, and was a large affair composed of sticks mainly. The startled adult hawk betrayed the nest by flying from it. Only one adult hawk was seen and this bird uttered shrill cries in the woods when the nest was climbed to, but did not come near. The two young Goshawks in their natal down were photographed May 26; and again June 5, in their juvenal plumage. The first picture shows well the mixture of natal down and juvenal feathers sprouting through it—particularly the quills and other feathers of the wing; the second, the juvenal plumage with some of the natal down still adhering, especially on and around the head. One of these young hawks became partly paralyzed and died some time later, but the other lived until July 12.